

*Full Length Research Paper*

# **A study into the factors that influence female engineering students' career choice: a case study of Mutare Polytechnic, Zimbabwe**

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Accepted 18 May, 2007

**The purpose of this research was to identify the factors which influence the female engineering students' career choice in the beginning of the twenty-first century. A further investigation was done to identify the degree to which these factors influence female students in choosing engineering as a career. A case study was carried out with the female engineering students at Mutare Polytechnic which is currently undergoing a process of acquiring university status. Engineering lecturers at the same college were also involved in the study. Despite all the negative influences experienced by the female engineering students in their career choice, sheer interest in engineering had caused them to choose the career as indicated by the 98% approval from the female engineering students. It was also possible to make recommendations with the view to improve the advancement of females in engineering careers.**

**Key words:** Factors influencing, female engineering students, career choice, engineering, interest.

## **INTRODUCTION**

On the basis of the empirical evidence and literature consulted, it was possible to establish the main factors which influenced female engineering students' career choice. Genuine interest; intellectual and physical capability; parental influence; peer pressure; societal labelling; government laws and regulations; employers' attitude and employment conditions; educational media sex-stereotyping; teachers' influence and school labelling were among the main influencing factors.

## **METHODOLOGY**

The descriptive survey method was used to gather data and analyse the information. Twenty eight questionnaires with responses from the intended sample were received. The responses were of varying character such that some statistical analysis was essential. In order to comprehend the results easily, the results were displayed on pie-charts.

It should be noted that the twenty eight questionnaire responses were composed of thirteen from engineering lecturers and fifteen

from female engineering students. In order to make the results more meaningful, each factor was analysed individually and presented in a pie-chart such that the percentages of the responses could be clearly shown.

## **RESULTS AND ANALYSIS**

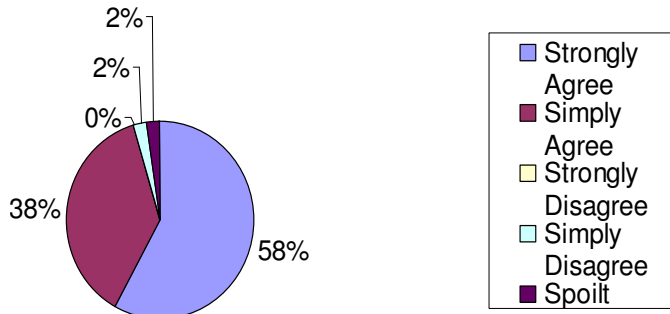
This section presents the results and analyses them. Various notions were expressed and simple statistical methods were used to analyse them. Each factor was taken separately and a comparison was made between female engineering students' responses and the lecturers' responses. Recommendations and conclusion were given in light of the objectives of the study.

### **Genuine interest in engineering by female students**

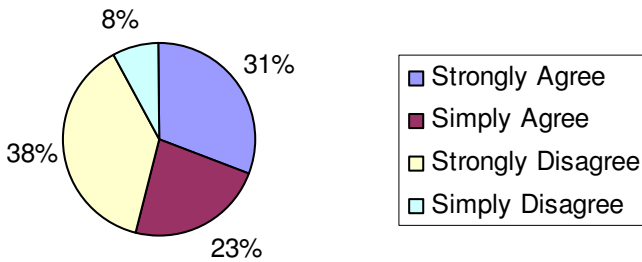
From the results presented in Figure 1, it was evident that female engineering students had genuine interest in engineering as indicated by the 98% approval from the students. Even 54% of the lecturers went on to say that some females are more interested in engineering than

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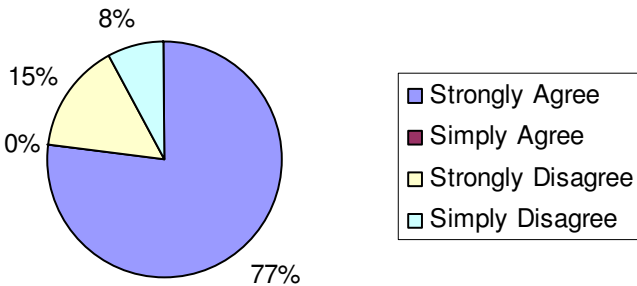
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**Figure 1.** Genuine interest in engineering led the female students to study engineering: Female students' responses.

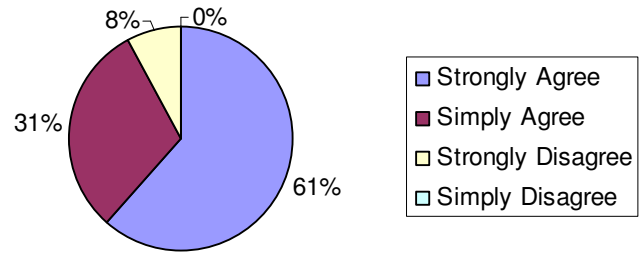


**Figure 2.** Some female students are more interested in engineering than males: Lecturers' responses.

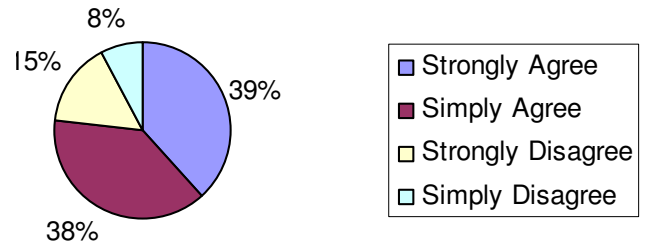


**Figure 3.** Female students are intellectually gifted as their male counterparts to successfully study engineering: Lecturers' responses.

males (Figure 2). Therefore it appeared that sheer interest in the engineering field made female engineering students to choose this profession. This explains why a 15 year old girl in New South Wales (NSW), Australia “successfully took a case against the NSW Minister of Education and the NSW Director General because her girls school did not provide the technical crafts and computing which were available to her twin brother at his boys’ school” (Byrne, 1991). The case was heard at a Tribunal under the NSW states anti-discrimination legislation, and was awarded in the girl’s favour.



**Figure 4.** Female students find engineering more demanding and wearisome as compared to males: Lecturers' responses.



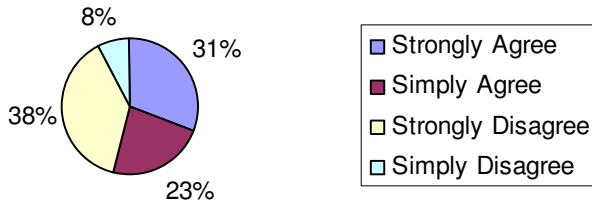
**Figure 5.** Parents negatively influence female students' engineering: Lecturers' responses.

**Intellectual and physical capability**

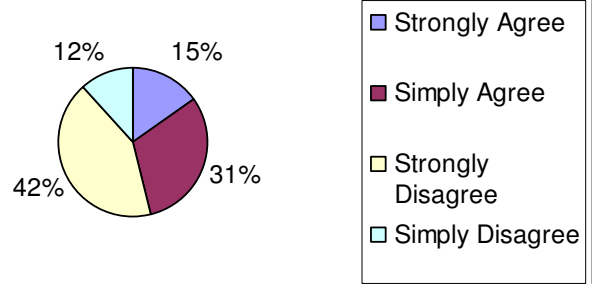
It was evident that the female engineering students are as intellectually competent just as boys to comprehend all the engineering tasks as indicated by 77% of the lecturers (Figure 3). However, 61% of the lecturers strongly agreed that female engineering students could not cope physically as boys with the manual tasks which engineering at times called for (Figure 4). Nevertheless, this should not rule out females from engineering because their short-comings in physical fitness might lead them into designing machinery to overcome this weakness. Since they were observed to be intellectually competent, they might even invent new devices to enable them to perform better and efficiently in engineering jobs. This would ultimately lead to an improvement in the available engineering technology.

**Parental influence**

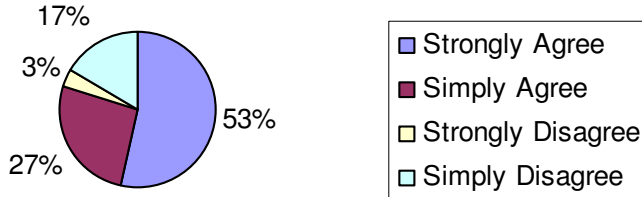
Parents in general seemed to be apparently discouraging female students from venturing into the engineering profession as indicated by 80% of the female engineering students (Figure 7) and 77% of the lecturers (Figure 5). It could be said that parents were not buying female children engineering toys and were always painting in the minds of these little ones that engineering was not for girls. Since parents are the early associates and socialisers of the female children, they strongly hinder



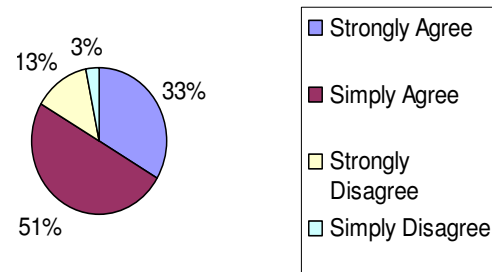
**Figure 6.** Parents' positively influence female students' studying of engineering: Lecturers' responses.



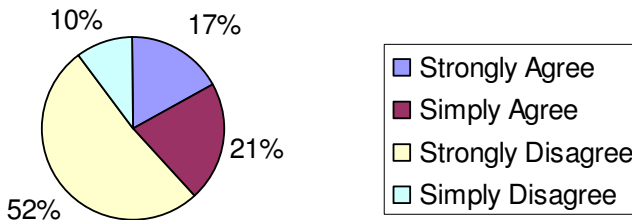
**Figure 9.** Peer pressure encourages females to go for engineering: Lecturers' responses.



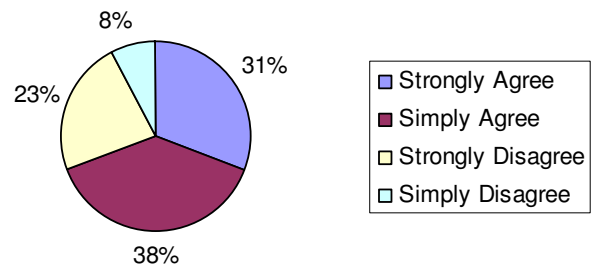
**Figure 7.** Parents negatively influence female students studying of engineering: Female students' responses.



**Figure 10.** Society encourages females to get into engineering: Female students' responses.



**Figure 8.** Peer pressure encourages females to go for engineering: Female students' responses.



**Figure 11.** Societal labelling encourages females to get into engineering: Lecturers' responses

potential female engineers from being groomed. This may be the reason why few females were courageous enough to choose engineering as a profession.

However, it should be admitted that parents who were in the engineering field positively influenced their female children to join engineering as indicated by 54% of the lecturers (Figure 6). Margaret cited by Middleton in Weiner and Arnot (1987:84) says, "I ended up heading towards engineering because I could not think of anything else. My father kept saying how good it would be." Hence some parents explicitly encourage their female children to study engineering.

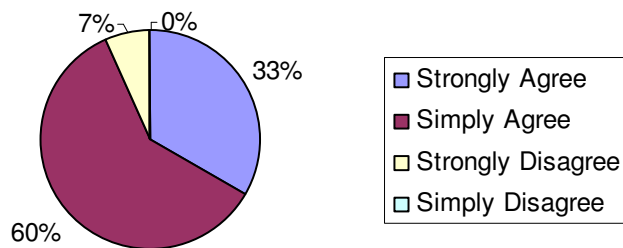
### Peer pressure

It appeared that peer pressure, generally, did not significantly influence female students towards choosing engineering as a career as indicated by the 52% (Figure 8) and 42% (Figure 9) of the female students and lecturers respectively who strongly subscribed to the notion How-

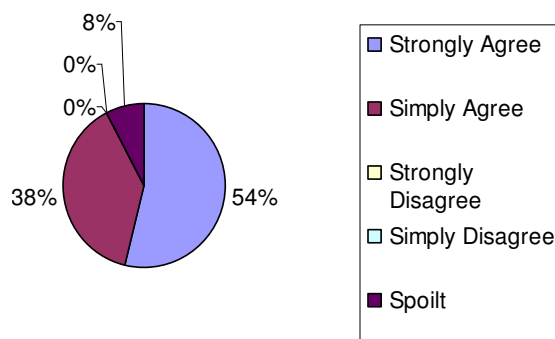
ever, Giddens (1993:168) argues that "peer-group socialisation tends to play a major part in reinforcing and further shaping gender identity throughout a child's school career." Therefore, peer pressure should not be ruled out as a factor influencing female students' career choice because respondents are not unanimous on its influence.

### Societal labelling

It could be said that the society had changed its attitude towards engineering as a field suited for males only. There seemed to be an awareness that females could also venture into the engineering field and perform significantly just as their male counterparts, as indicated by



**Figure 12.** Government encourages females to get into engineering: Female students' responses.



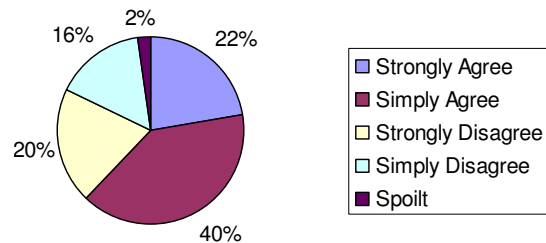
**Figure 13.** Government encourages females to get into engineering: Female students' responses.

84% of the female students (Figure 10) and 69% of the lecturers (Figure 11). However, it was still evident that some societal elements believed that females could not study engineering. This could be attributed to the fact that the Zimbabwean society is a patriarchal one which traditionally considered engineering to be a males' domain. It actually takes time to totally eliminate the remnants of such a system.

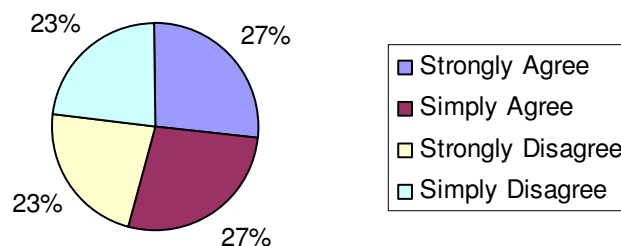
From the Marxist perspective, a patriarchal society would have all females do all the domestic work to the benefit of the males who are considered as bread winners. This would afford males of more prestigious jobs, at the expense of females, reaping all the benefits of engineering jobs at the expense of women.

### Government laws and regulations

Stewart (1981) says that "many laws tend to favour men" in the working place. Nevertheless, this study established that the Zimbabwean government has gone a long way in encouraging females to enter the engineering field as indicated by 92% of the lecturers (Figure 13) and 93% of the female engineering students in their responses (Figure 12). The introduction of laws which necessitated equal pay to both males and females, removal of discrimination of sex when it comes to engineering jobs and fully paid maternity leave made the engineering field attr-



**Figure 14.** Employers encourage females to get into engineering: Female students' responses.



**Figure 15.** Employers encourage females to get into engineering: Lecturers' responses.

active to females.

However, there was a general consensus that the government should continue improving its support for females in engineering fields.

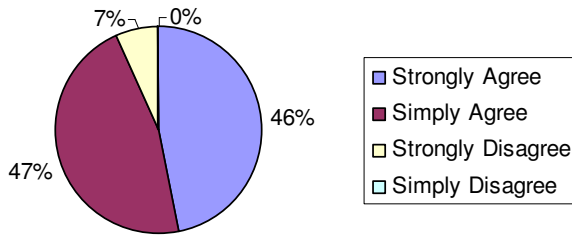
### Employers' attitudes and employment conditions

From the results of the research it was evident that the employers' attitudes towards the employment of female engineers had positively changed in favour of the females as indicated by 62% of the female students (Figure 14) and 54% of the lecturers (Figure 15). It appears most employers were giving the same pay for both males and females for the same jobs.

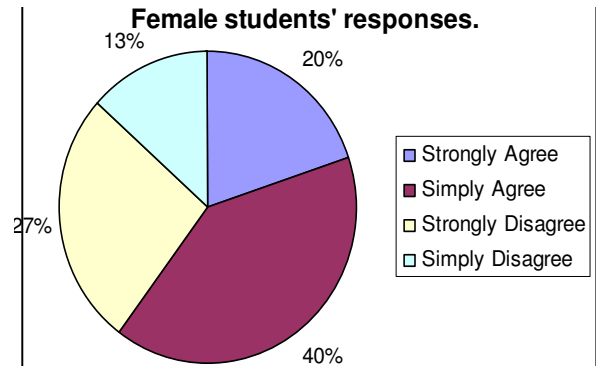
However, there was still the need of improving the working environment further to make the work place more comfortable for female employers. This could be done by providing baby seating facilities to working mothers, time allowances to suckling mothers, extension of the maternity leave period and affording females equal promotion prospect as those of males. Nevertheless the provision of these facilities should not compromise productivity.

A lot still needs to be done in educational media to avoid sex stereotyping, since 93% of the female engineering students indicated that it was existing (Figure 16). Since the producers of educational media were males who were living in a patriarchal Zimbabwean society, there was no easy way to avoid sex stereotyping.

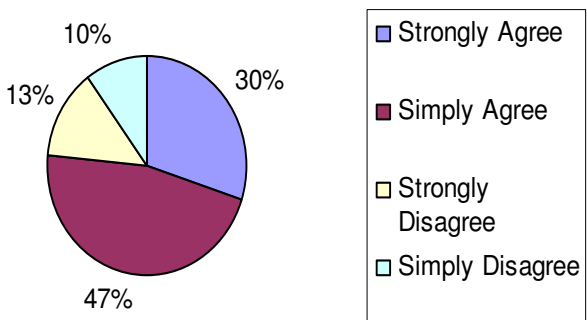
It was unfortunate that the reflections of the Zimbabwean patriarchal society were rampant in the educational media such that most females considered engineering to



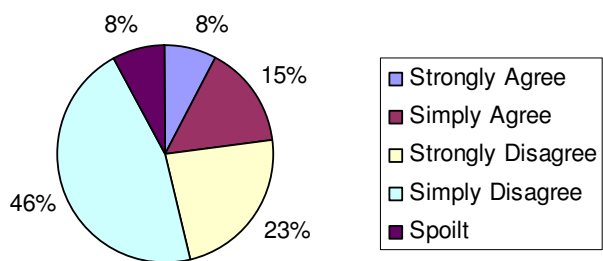
**Figure 16.** Sex-stereotyping in the educational media discourages females from doing engineering: Students' responses.



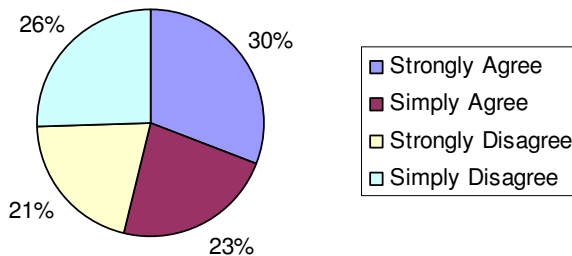
**Figure 19.** Teachers negatively influence females not to study engineering: Female students' responses.



**Figure 17.** School labelling discourages females from getting into engineering: Students' responses.



**Figure 20.** Teachers negatively influence female not to study engineering: Lecturers responses.



**Figure 18.** School labelling discourages females from getting into engineering: Lecturers' responses.

be a males' field, hence the low enrolment of the female engineering students.

**School labelling**

The study revealed that school labelling of subjects as suited for males and females was still going on as indicated by 77% of the female students (Figure 17) and 53% of the lecturers (Figure 18). It appears as if labelling of Fashion and Fabrics as suitable for females; and engineering drawing, metal work and wood work as suitable for males was being propagated in the school curriculum. This automatically denied the female students the opportunity of getting oriented towards engineering jobs as early as the primary and secondary educational

levels. This explained why the Zimbabwean education system channelled most of the females away from engineering profession.

**Teachers' influence**

Teachers, on the other hand, instead of instilling into the female students that they could perform well in engineering jobs, tended to discourage them from getting involved in engineering jobs, as observed by 60% of the female students (Figure 19). Although 69% of the lecturers disagreed to this notion (Figure 20), it could be said that teachers unconsciously communicated to the female students that engineering was not suitable for them. It should be remembered that 61% of the lecturers earlier on said that females could not physically cope with the rigours of engineering. Therefore one would say that the disagreement by 69% of the lecturers to the notion was just a way of hiding unsuccessfully from the truth, and a way of shielding themselves from attack by female students and the other feminists. This also explains why a few females were courageous enough to enter the engineering field.

**Recommendations**

From the foregoing, the following recommendations were

made to ensure that more female students would be encouraged to choose engineering as a career for life:

i. Parents should identify the potential of their children and encourage them to pursue their areas of interest. If the female child shows an interest in the engineering profession, parents should provide the girl with engineering toys and expose the child to more engineering items as a way of nurturing the interest. They should not fear that the girl would not prosper in engineering since some females have proved that wrong.

ii. The society, in general, should respect the interest of female engineering students and refrain from scoffing at them. Engineering should be taken by the society as similar to any other job taken by females, and there is nothing strange in a female having interest in engineering. More workshops, conferences and seminars should be organised to conscientise the society about the need of involving the females in engineering jobs. The society should bear in mind that if a woman is educated it follows that a nation is educated. It is also true that if one woman is turned into an engineer, the whole nation is technologically improved since the mother spends most of the time teaching the child.

iii. The government should continue improving its support to female engineers through the instituting of laws and regulations which improve the female engineers' working conditions.

iv. Employers need to be conscientised that females can perform satisfactorily well in what men can do as far as engineering work is concerned, both intellectually and physically. Haralambos and Holborn (1995) also support this notion by saying that studies have proved "girls have more innate ability than boys". They should not fear that productivity of their companies will decrease when they employ female engineers. In order for them to reap the benefits of employing females, they should utilise all the engineering potential residing in females through the provision of equal working conditions, equal pay, equal fringe benefits, and equal promotion opportunities to those of men and should ensure that they provide the special facilities required by suckling mothers and those on maternity leave.

v. The producers of educational media should ensure that sex stereotyping is avoided in the media so as not to discourage potential female engineering students from pursuing their chosen career. Females should be portrayed in the educational media performing engineering jobs such as motor mechanics and repairing of electrical appliances.

vi. The school curriculum should be such that Fashion and Fabrics and Metal or Wood Work are not time-tabled

concurrently. School mechanism should not in any way indicate that Fashion and Fabrics, Cookery, Food and Nutrition are solely for the females. It should not also label Wood Work, Metal Work, Mathematics, Science and Technical Drawing as subjects for males. Students should be allowed to freely do these subjects irrespective of their sex. By so doing, the females will not be channelled away from engineering professions.

vii. Teachers should bear in mind that girls can perform well in engineering just as boys. Therefore, they should nurture the female students' interest in engineering through the provision of engineering literature. They should afford the students some engineering excursions regardless of their sex. This provides the opportunity for the potential female engineers to develop their talents and interest in engineering.

## Conclusion

From the fore-going, it was explicit that the factors which influence female engineering students' career choice were diverse. Although other factors seemed to be more prominent they were inter-linked with others such that one could not deal with one factor without referring to the other. It was interesting to note that the female engineering students unanimously agreed that they had interest in the engineering career. This provides a strong base for them to succeed in engineering. However, this interest had to go unfortunately through depressants such as parental, societal, school and teachers' discouragement. Nevertheless, the efforts by the government and the employers to open up ways for females to venture into engineering should be appreciated although there is still a lot to be done to make the females feel more comfortable in the engineering working environment.

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